

its place --scanning head--.

Page 30, line 9, delete "3-D piezo actuator" and insert in its place --scanning head--.

In the Claims

Rewrite claim 1 as follows:

1. (Amended) In a scanned probe microscope apparatus having a probe and a scanning head arranged for operative engagement of a surface of a sample for measuring a surface topography thereof, the improvement comprising:

- a. said probe having a hardness greater than a sample to be tested;
- b. a force sensor operatively located to measure the force between said sample and said probe, said force sensor having an output signal, wherein said force sensor includes,
 - i. a pair of capacitive transducers, each transducer including a separate drive plate, the first of said drive plates having a hole centrally disposed therethrough, and a shared [pickup] pick-up plate, said [pickup] pick-up plate positioned between said separate drive plates and separated from each drive plate by an insulating spacer, said drive plates having spaced opposing conductive surfaces when said [pickup] pick-up plate is mounted therebetween, said [pickup] pick-up plate

further including a conductive central plate suspended by spring means between said drive plates, wherein said central plate is capable of deflection between the conductive surfaces of each of said drive plates; and

ii. means for transmitting force from a point remote from said central plate to said central portion; and

92
c. means for measuring the output signal of said force sensor and utilizing said output signal to control a vertical movement of said [piezo actuated] scanning head to maintain a constant force on a sample as said surface topography is measured.

[Rewrite claim 2 as follows:]

2. (Amended) The apparatus of claim 1, wherein said scanning head has a piezo actuated head having said probe mounted thereon [and said force sensor is mounted on a fixed base].

3
[Rewrite claim 4 as follows:]

4. (Amended) The apparatus of claim 1, wherein said probe is mounted on said force sensor and said force sensor is further mounted on said scanning head for operatively engaging said sample on a fixed surface.

94 [Rewrite claim 6 as follows:

5
6. (Amended) The apparatus of claim 1, further comprising means for applying a downward force to said probe, wherein said force sensor measures said force and said means for measuring the output signal of said force sensor converts said output signal to a signal representative of the force during an indentation test.

95 [Rewrite claim 8 as follows:

7
8. (Amended) The apparatus of claim 1, wherein said spaced opposing conductive surfaces of said drive plates each have a generally rectangular metalized pattern disposed centrally thereon with an unmetalized perimeter, said metalized patterns are coincidentally aligned.

[Rewrite claim 13 as follows:

13. (Amended) In a scanned probe microscope apparatus having a probe and a scanning head arranged for operative engagement of a surface of a sample for measuring a surface topography thereof, the improvement comprising:

- 96
crit
- a. said probe having a hardness greater than a sample to be tested;
 - b. a force sensor operatively located to measure the force between said sample and said probe, said force sensor having an output signal, wherein said force sensor includes,
 - i. a first substrate layer having a metalized inner and a metalized outer surface, said metalized outer

surface defining a first exterior surface of said force sensor [element] and said metalized inner surface including a first plate of a first variable capacitor, said first plate further having a hole centrally disposed therethrough;

- 96
CMB
- ii. a second substrate layer including an insulating layer, said second substrate layer having an open central portion, said second substrate layer further having a first and second surface, said first surface mounted in planar contact with said inner surface of said first substrate layer;
 - iii. a third substrate layer having a first and second surface, said first surface mounted in planar contact with said second surface of said second substrate layer, said third substrate layer made from a conducting material and having a central plate which is suspended by spring means;
 - iv. a fourth substrate layer including an insulating layer, said fourth substrate having an open central portion, said fourth substrate layer further having a first and second surface, said first surface mounted in planar contact with said second surface of said third substrate layer;
 - v. a fifth substrate layer having a metalized inner and a metalized outer surface, said metalized outer surface defining a second exterior surface of said

- 96
cmf
- force sensor [element] and said metalized inner surface forming a first plate of a second variable capacitor, said inner surface of said fifth substrate mounted in planar contact with said second surface of said fourth substrate; and
- vi. means for transmitting force from a point remote from said central plate to said central plate; and
- c. means for measuring the output signal of said force sensor and utilizing said output signal to control a vertical movement of said [piezo actuated] scanning head to maintain a constant force on a sample as said surface topography is measured.

[Rewrite claim 16 as follows:

16. (Amended) The apparatus of claim 13, wherein said probe is mounted on said force sensor and said force sensor is further mounted on said scanning head for operatively engaging said sample on a fixed surface.

[Rewrite claim 18 as follows:

18. (Amended) The apparatus of claim 13, further comprising means for applying a downward force to said probe, wherein said force sensor measures said force and said means for measuring the output signal of said force sensor converts said output signal to a signal representative of the force during an indentation test.

[Rewrite claim 25 as follows:

25. (Amended) In a scanning tunneling microscope apparatus having a base for mounting a sample thereon and a piezo actuated head having a probe mounted thereon for operative engagement of a sample mounted on said base for measuring a surface topography, the improvement comprising:

- a. a probe having a hardness greater than a sample to be tested mounted on said piezo actuated head;
- b. a force sensor mounted on said base for mounting a sample, said force sensor having an output signal, wherein said force sensor includes,
 - i. a pair of capacitive transducers, each transducer including a separate drive plate, the first of said drive plates having a hole centrally disposed therethrough, and a shared [pickup] pick-up plate, said [pickup] pick-up plate positioned between said separate drive plates and separated from each drive plate by an insulating spacer, said drive plates having spaced opposing conductive surfaces when said [pickup] pick-up plate is mounted therebetween, said [pickup] pick-up plate further including a conductive central plate suspended by spring means between said drive plates, wherein said central plate is capable of deflection between the conductive surfaces

of each of said drive plates; and

ii. means for transmitting force from a point remote from said central plate to said central [portion] plate; and

c. means for measuring the output signal of said force sensor and utilizing said output signal to control a vertical movement of said piezo actuated head to maintain a constant force on a sample as said surface topography is measured.

98
Amel
[Rewrite claim 26 as follows:]

26. (Amended) The apparatus of claim 25, further comprising means for applying a downward force to said probe, wherein said force sensor measures said force and said means for measuring the output signal of said force sensor converts said output signal to a signal representative of the force during an indentation test.

[Rewrite claim 28 as follows:]

28. (Amended) The apparatus of claim 25, wherein said spaced opposing conductive surfaces of said drive plates each have a generally rectangular metalized pattern disposed centrally thereon with an unmetalized perimeter, said metalized patterns are coincidentally aligned.

99
Amel
[Rewrite claim 29 as follows:]

29. (Amended) The apparatus of claim 28, further comprising

Amended
an unmetalized portion on the opposing conductive surface of [said] the second of said drive plates approximating the size and shape of said hole in said first drive plate and aligned therewith.

Rewrite claim 33 as follows:

33. (Amended) In a scanning tunneling microscope apparatus having a base for mounting a sample thereon and a piezo actuated head having a probe mounted thereon for operative engagement of a sample mounted on said base for measuring a surface topography, the improvement comprising:

- 9/10*
Amended
- a. a probe having a hardness greater than a sample to be tested mounted on said piezo actuated head;
 - b. a force sensor mounted on said base for mounting a sample, said force sensor having an output signal, wherein said force sensor includes,
 - i. a first substrate layer having a metalized inner and a metalized outer surface, said metalized outer surface defining a first exterior surface of said force sensor [element] and said metalized inner surface including a first plate of a first variable capacitor, said first plate further having a hole centrally disposed therethrough;
 - ii. a second substrate layer including an insulating layer, said second substrate layer having an open central portion, said second substrate layer further having a first and second surface, said

first surface mounted in planar contact with said inner surface of said first substrate layer;

iii. a third substrate layer having a first and second surface, said first surface mounted in planar contact with said second surface of said second substrate layer, said third substrate layer made from a conducting material and having a central plate which is suspended by spring means;

iv. a fourth substrate layer including an insulating layer, said fourth substrate having an open central portion, said fourth substrate layer further having a first and second surface, said first surface mounted in planar contact with said second surface of said third substrate layer;

v. a fifth substrate layer having a metalized inner and a metalized outer surface, said metalized outer surface defining a second exterior surface of said force sensor [element] and said metalized inner surface forming a first plate of a second variable capacitor, said inner surface of said fifth substrate mounted in planar contact with said second surface of said fourth substrate; and

vi. means for transmitting force from a point remote from said central plate to said central plate; and

c. means for measuring the output signal of said force

9/10
amf

sensor and utilizing said output signal to control a vertical movement of said piezo actuated head to maintain a constant force on a sample as said surface topography is measured.

[Rewrite claim 34 as follows:]

34. (Amended) The apparatus of claim 33, further comprising means for applying a downward force to said probe, wherein said force sensor measures said force and said means for measuring the output signal of said force sensor converts said output signal to a signal representative of the force during an indentation test.

11
Add new claim 41 as follows:

41. In a scanned probe microscope apparatus, the improvement comprising:

- 60
- a. a high precision sensor including a pair of capacitive transducers, each transducer including a separate drive plate, and a shared pick-up plate movably mounted between the separate drive plates;
 - b. means for transmitting force from a point remote from said pick-up plate to said pick-up plate; and
 - c. means responsive to the position of the pick-up plate relative to the drive plates for providing an output signal proportional to said relative position.